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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/882,208	06/13/2001	Robin Cheung	AMAT/3840/MD/COPPER/PJS	8450

7590  
Patent Counsel  
Applied Materials, Inc.  
P.O. Box 450-A  
Santa Clara, CA 95052

12/02/2003

EXAMINER
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NICOLAS, WESLEY A

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 12/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/882,208

Applicant(s)

CHEUNG ET AL.

Examiner

Wesley A. Nicolas

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) 29-52 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 54-57 is/are allowed.
- 6) ☒ Claim(s) 1-28 and 53 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This is in response to the Amendment submitted September 12, 2003. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-57 are currently pending in this application, with claims 29-52 drawn to a non-elected invention.

#### **Election/Restriction**

1. Claims 29-52 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 10.

Applicant asserts that claims 29-52 should be reconsidered because they are drawn to a proper combination in relation to a subcombination as set forth in elected claim 1. Examiner must respectfully disagree. Even if claims 29-52 were drawn to a proper combination, which they are not, claims 29-52 are drawn to a patentably distinct invention. The alleged combination claim 29 doesn't even include all the particulars of the alleged subcombination of claim 1 (claim 29 is missing "adding the one or more constituents to the bath...") because the step of "adding the one or more constituents" (claim 1) is materially different than having a bath comprising "an additive material" (claim 29). Furthermore, since Applicant has not provided express admission that the claimed inventions are indistinct as required by Lee, the restriction as set forth in the

previous Office action has been maintained. In re Lee, 199 USPQ 108 (Deputy Asst. Comm'r. for Pats 1978).

Accordingly, the restriction requirement is hereby being made **FINAL**.

### **Specification**

2. The objection to the title as set forth in the previous Office action has been **withdrawn** in view of Applicant's change to the title in the paper submitted September 12, 2003.

### **Claim Rejections - 35 USC § 102**

3. Claims 1-5, 7-8, 10-15, 17-27 and 53 are rejected under 35 U.S.C. 102(e) as being anticipated by Reid (U.S. 6,458,262 B1).

The 35 U.S.C. § 102 rejection of claims 1-5, 7-8, 10-15, 17-27 and 53 using Reid has been **withdrawn** in view of Applicant's arguments submitted September 12, 2003.

### **Claim Rejections - 35 USC § 103**

4. Claims 6, 9, 16, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid (U.S. 6,458,262 B1), as applied to claims 2, 7, 14, and 22 above, and further in view of Hodgens, II ("Hodgens") (5,017,410).

The 35 U.S.C. § 103 rejection of claims 6, 9, 16, and 28 using Reid and Hodgens has been **withdrawn** in view of Applicant's arguments submitted September 12, 2003.

**New Rejections**

5. Claims ????? are rejected under 35 U.S.C. 102(e) as being anticipated by Uzoh et al. (6,113,769).

Claim 1 is rejected because Uzoh et al. teach a method of adjusting an electrochemical bath in an electrochemical deposition system, comprising identifying one or more constituents generated during the electrochemical deposition process (Abstract) and adding the one or more constituents to the electrochemical bath (Abstract and cols. 1-8, and e.g. Fig. 1, numerals 5, 7, and 9).

Claim 2 is rejected because Uzoh et al. teach that the identifying one or more constituents generated during the electrochemical deposition process comprises:

- analyzing at least a portion of a first electrochemical bath to determine a first bath composition (cols. 7-8);
- analyzing at least a portion of a second electrochemical bath produced from utilizing the first electrochemical bath in an electrochemical deposition process to determine the second bath composition (cols. 7-8); and
- comparing the first and second bath compositions to identify some of the one or more constituents generated in the electrochemical deposition process (cols. 7-8).

Claim 5 is rejected because Uzoh et al. teach that the first electrochemical bath is an electroplating bath (col. 1).

Claim 6 is rejected because Uzoh et al. teach that said first electrochemical bath is an electroless bath (col. 1).

Claim 7 is rejected because Uzoh et al. teach a method of adjusting an electrochemical bath in an electrochemical deposition process, comprising:

- a) providing a first electrochemical bath having a first bath composition (cols. 7-8);
- b) utilizing the first electrochemical bath in an electrochemical deposition process to form a second electrochemical bath having a second bath composition (cols. 7-8);
- c) analyzing the first and second bath compositions to identify one or more constituents generated in the electrochemical deposition process (cols. 7-8); and
- d) adjusting the one or more constituents to the first bath composition (cols. 7-8).

Claim 8 is rejected because Uzoh et al. teach that the first electrochemical bath is an electroplating bath (col. 1).

Claim 9 is rejected because Uzoh et al. teach that said first electrochemical bath is an electroless bath (col. 1).

Claim 10 is rejected because Uzoh et al. teach that the electrochemical deposition process deposits a metal film on a substrate (col. 1).

Claim 11 is rejected because Uzoh et al. teach that the metal film comprises a conductive metal such as copper (col. 3).

Claim 12 is rejected because Uzoh et al. teach that analyzing the first and second electrochemical bath compositions comprises directing at least a portion of the first and second electrochemical bath to a chemical analyzer (cols. 4-8).

Claim 14 is rejected because Uzoh et al. teach a method of adjusting an electrochemical bath in an electrochemical deposition system, comprising:

- a) providing a first electrochemical bath (cols. 4-8);

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- b) analyzing at least a portion of the first electrochemical bath to determine a first bath composition (cols. 4-8);
- c) utilizing the first electrochemical bath in an electrochemical deposition process to form a second electrochemical bath (cols. 4-8);
- d) analyzing at least a portion of the second electrochemical bath to determine a second bath composition (cols. 4-8);
- e) comparing the first and second bath compositions to identify one or more constituents generated in the electrochemical deposition process (cols. 4-8); and
- f) adding the one or more constituents to the first bath composition (cols. 4-8).

Claim 15 is rejected because Uzoh et al. teach that the first electrochemical bath is an electroplating bath (col. 1).

Claim 16 is rejected because Uzoh et al. teach that said first electrochemical bath is an electroless bath (col. 1).

Claim 19 is rejected because Uzoh et al. teach that the electrochemical deposition process deposits a metal film on a substrate (col. 1).

Claim 20 is rejected because Uzoh et al. teach Reid teaches that the metal film comprises a conductive metal such as copper (col. 3).

Claim 21 is rejected because Uzoh et al. teach that comparing the first and second bath compositions to identify one or more constituents generated in the electrochemical deposition process comprises comparing the analyses of the first and second electrochemical baths (cols. 4-8).

Claim 22 is rejected because Uzoh et al. teach A method of adjusting an electrochemical bath for an electrochemical deposition process, comprising:

- a) providing a first electrochemical bath having a first bath composition (cols. 4-8);
- b) utilizing the first electrochemical bath in an electrochemical deposition process to form a second electrochemical bath having a second bath composition comprising one or more generated constituents (cols. 4-8);
- c) identifying at least some of the one or more generated constituents by analyzing the first and second bath compositions (cols. 4-8); and
- d) adding an additive material having a composition that is substantially the same as at least some of the one or more generated constituents to a third electrochemical bath to form a fourth electrochemical bath (cols. 4-8).

Claim 23 is rejected because Uzoh et al. teach that the third electrochemical bath has the composition of the first electrochemical bath (cols. 4-8).

Claim 24 is rejected because Uzoh et al. teach that identifying at least some of the one or more constituents generated during the electrochemical deposition process comprises: analyzing at least a portion of the first electrochemical bath to determine the first bath composition (cols. 4-8); analyzing at least a portion of the second electrochemical bath produced from utilizing the first electrochemical bath in the electrochemical deposition process to determine the second bath composition (cols. 4-8); and comparing the first and second bath compositions to identify at least some of the one or more constituents generated in the electrochemical deposition process (cols. 4-8).



Claim 27 is rejected because Uzoh et al. teach that the first electrochemical bath is an electroplating bath (col. 1).

Claim 28 is rejected because Uzoh et al. teach that said first electrochemical bath is an electroless bath (col. 1).

6. Claims 3-4, 13, 17-18, 25-26, and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh et al. (6,113,769) as applied to claims 2, 12, 14, and 24 above, and further in view of Belongia et al. (6,391,209 B1).

Uzoh et al. are as applied, argued, and disclosed above and incorporated herein, but fail to specifically teach the use of a high performance liquid chromatography (HPLC) chemical analyzer.

Belongia et al. teach the use of a HPLC chemical analyzer (col. 8).

Claims 3-4, 13, 17-18, 25-26, and 53 are rejected because it would have been obvious and within the ordinary skill in the art at the time the invention was made to have modified Uzoh et al. to use the HPLC chemical analyzer of Belongia et al. because Belongia et al. teach that the use of an HPLC chemical analyzer provides accurate measurement of bath constituents, thereby providing accurate dosing of the additives.

#### **Allowable Subject Matter**

7. Claims 54-57 are allowed over the prior art of record.

8. The following is a statement of reasons for the indication of allowable subject matter:

The specific method of adjusting an electrochemical bath for an electrochemical deposition process, comprising:

- a) providing a first copper electroless bath having a first bath composition;
- b) utilizing a portion of the first copper electroless bath in an electroless deposition process to form a second copper electroless bath having a second copper electroless bath composition comprising one or more generated constituents
- c) identifying at least some of the one or more generated constituents by determining the first and second copper electroless bath compositions, wherein identifying at least some of the one or more constituents generated during the electrochemical deposition process comprises:
  - o (i) analyzing a portion of the first copper electroless bath to determine the first bath composition;
  - o (ii) analyzing a portion of the second copper electroless bath to determine the second bath composition; and
  - o (iii) comparing the first and second copper electroless bath compositions to identify at least some of the one or more constituents generated in the electroless deposition process was not taught or suggested by the prior art of record.

**REMARKS - Response to Arguments**

9. Applicant asserts that the 35 U.S.C. § 102(e) rejection as set forth in the previous Office action is improper because Applicant's filing date in a provisional application ante-dates the 102 reference. Applicant's arguments regarding the date are convincing and Examiner inadvertently overlooked the effective filing date of the instant application. As such, Examiner has withdrawn the previous § 102(e) rejection in favor of a new rejection and this Office action is being made non-final as a result.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. 6,471,845 B1 (Dukovic et al.)

U.S. 2003/0173224 A1 (Graham et al.)

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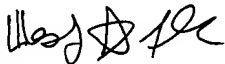
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley Nicolas whose telephone number is (703)305-0082. The examiner can normally be reached on Mon.-Thurs. from 7am to 5pm.

The Supervisory Primary Examiner for this Art Unit is Roy King whose telephone number is (703) 308-1146.

The fax number for this Group is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

  
**WESLEY A. NICOLAS**  
**PATENT EXAMINER**

November 30, 2003